

CSE230 Project 4B – Fall 2006 – UML Design

Due: Friday, November 17, 2006

In this second part of Project 4, you are to, as a team, develop a UML design consisting of Component, Deployment, Class, and Object Diagrams, for handling additional and new features of HDIS related to a home's renovation which includes both mortgage applications (homeowners), posting blueprints (by homeowners for contractors), submitting "sealed" bids (contractors), and selecting a bid (homeowners). In the process, you are to consider at a design (and potential implementation level) the security issues and solutions that must be considered (design) and adopted (implementation). The scenario and assumptions to consider in your design are considered as four separate facets of the problem:

- **Home Equity Application:** To finance the renovation, a homeowner will utilize a home equity application to obtain funds via a mortgage on their current primary residence. For an example of these types of on-line applications, see www.eloan.com, www.LendingTree.com, or any other on-line site. This will provide you with an idea of the type of information required and the steps of the process. Pay attention to where security plays a role in this process.
- **Posting Blueprints:** Once a homeowner has acquired approved financing, they can then utilize a capability of HDIS that allows their detailed blueprint to be securely posted in electronic form. The homeowner may also be able to post information on their existing property (e.g., location, house style, materials, siding, etc.) and perhaps even allowed to specify an optional bidding range (minimum and/or maximum). To actually post the blueprint, you may allow for multiple formats (PDF, JPEG, GIF, etc.) to be uploaded. Posted blueprints have a deadline for the bidding process. There may also be a two phase bidding process: preliminary bids to perform a first phase of screening, and then final bids for all accepted preliminary bids; note that this is an option but not required. As part of this process, a homeowner may decide to select a group of general contractors for bidding or have the bidding process be more open (or restricted to a geographical area - bidders from Tolland County). To simplify your design, let us assume that the general contractor will provide a bid for the entire project, which will include framing, electrical, plumbing, drywall, finish carpentry, etc.; essentially submitting a single sealed bid.
- **Bid Submission Process:** The contractor must register with HDIS in order to be able to bid for projects. To register, the contractor must provide certain information (name, address, business name, location, years experience, type of home improvements, license, state, etc.); to assist you in figuring out appropriate registration information for contractors, please see the State of Connecticut site for contractors to apply for licenses at: http://www.ct.gov/dcp/lib/dcp/pdf/forms/cpfr-13_hic_application_3-28-06.pdf Once registered, a contractor is added to a list of registered contractors, and this information is made available to homeowners for renovation projects. A contractor who is

allowed to bid on a renovation project can view the blueprints, securely interact with the homeowner (via a secure chat session or via a secure email) to ask questions and receive clarifications, or can post questions in a public forum (available to all contractors bidding on the project) with answers supplied by the homeowner also posted for all. The contractor has a deadline to submit the bid (preliminary and/or final), and can do so securely. If preliminary bids are required, there is a second phase of bidding.

- **Bid Selection Process:** The homeowner is able to view all bids (preliminary and/or final bids), interact with contractors, and eventually, at the end of the process, select a winning bid. This winning bid will result in the establishment of a contract between the homeowner and awarded contractor for the renovation process. This requires the ability to link between homeowner information, loan information, blueprint information, and contractor information into what is essentially a renovation project instance.

Note that these assumptions are in some sense purposely vague. It is up to each team of students to brainstorm in order to scope their solution in terms of the required components, classes, and objects. For the aforementioned facets, not all information is provided and some provided information may not be necessary; each team must discern and extend from this common basis.

For Project 4, Part B, you are to develop, as a team, a detailed UML design (with associated written documentation) that considers the aforementioned four facets and provides the following:

1. **UML Component/Deployment Diagrams:** Your task in this is to develop either separate UML Component (see Slide UML-4.47) and Deployment (see Slide UML-4.60) diagrams or their combination (UML-4.62) in support of the four facets. You must concentrate on a web-based architectural solution that would employ https and other secure web technologies as part of the solution for the different components. Assume that there is also a database system (e.g., Oracle) and that your primary development language will be Java. Consider other security capabilities such as Java Encryption and its role in your solution.

The hand-in for this will be either individual Component and Deployment diagrams or their combination. For each diagram, include a labeled figure (use ALT-PRNTSCRN to copy and paste a screen shot into your MS Word file). Your written documentation (1 to 2 pages total) should explain the various components and their interactions.

2. **UML Class Diagram:** The expectation is that between 10-15 classes are needed to model the data and operations in support of Home Equity Application, Posting Blueprints, Bid Submission, and Bid Selection. The focus of your solution should be on the information that is required (in order to successfully model inheritance among various classes) and on the dependencies that are needed (say for the association among homeowner, loan, blueprint, and contractor for the renovation project instance).

The hand-in for this class diagram must include a labeled figure (perhaps multiple figures) of the UML class diagram (use ALT-PRNTSCRN to copy and paste a screen shot into your MS Word file). For each class of your diagram, write a short paragraph that explains your class, its data, and its relationship (inheritance and associations) to other classes.

3. **UML Object Diagram:** The intent for this diagram is to take your solution for the class diagram and create sample instances that illustrate the content of the diagram, the dependencies, the interactions, etc. Your Object diagram may have more nodes than your

class diagram, since you will likely have multiple instances for some classes. You want to represent at least one homeowner, one blueprint, three contractors (and their bids), and one defined renovation project instance. This will also include the ancestors of these various instances as well (e.g., a Person instance that would be an ancestor of homeowner and contractor).

The hand-in for this object diagram must include a labeled figure (perhaps multiple figures) of the UML object diagram (use ALT-PRNTSCRN to copy and paste a screen shot into your MS Word file). Provide sufficient explanation to link together your UML Class diagram and its Object counterpart.

Note that Together Architect (standalone or Eclipse version) must be used for this project. As a team project, it is not necessary to identify which student does which portion of your solution, but it is critical that the project is a shared effort. For two person teams, the recommendation is that one person concentrates on the Component/Deployment and a second on the Class diagram, with the team considering the Object diagram. Alternatively, one team member may do Component and Class diagrams and other team member may do Deployment and Object diagrams. Note that for 3 person teams, the expectation is that the design is more comprehensive and complete (you have 50). The key is that the resulting design solution must be consistent and uniform in its presentation. This should not look like different people did the project.

Project 4, Part B is to be done as a team and is due on Friday, November 17 2006, at 2pm (electronically to steve@engr.uconn.edu) with the hard copy submitted at the start of your laboratory session.